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Past Performance, Organizational Aspiration, and Organizational Performance: The Moderating Effect of Environmental Jolts

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Received: 4 June 2019; Accepted: 1 August 2019; Published: 5 August 2019



Abstract: Previous research has implied that past performance and organizational aspiration may have an important effect on the sustainable growth of organizational performance. Under the conditions of environmental jolts, their relationships are more complicated to discern. However, few studies have undertaken this investigation. Using data from 183 U.S. firms, this study proposes and tests a theoretical model of the relationships between past performance, organizational aspiration, and organizational performance at different environmental jolt levels. Through hierarchical regression analysis, the empirical findings suggest that low levels of environmental jolt weaken the positive relationship between organizational aspiration and organizational performance, while high levels of environmental jolt magnify the positive influence of past performance on organizational performance. Most importantly, the empirical findings reveal that at low levels of environmental jolt, past performance has no effect on organizational performance, while organizational aspiration has no effect on organizational performance when the level of environmental jolt is high. These interesting findings provide some implications for managers and enrich the theory of sustainable development.

Keywords: sustainable development; past performance; organizational aspiration; organizational performance; environmental jolt; behavioral theory of the firm

1. Introduction

The concepts of past performance and organizational aspiration have long been topics of interest in studies of the behavioral theory of the firm and strategic management [1–5]. Past performance is a backward-looking factor in which the success or failure of past events in an organization can effectively give feedback to organizational behaviors and strategies [6,7]. Organizational aspiration, also referred to as an organizational goal or reference point, is associated with a forward-looking search, utilizing current experiences of the organization to measure outcome levels in the future [8,9]. Both past performance and organizational aspiration are essential elements of an organization's identity that should be taken into account in sustainable development processes [10].

Some scholars argue that organizations with a history of superior performance may have a greater chance of improving organizational performance, because past successes could provide organizations with sufficient resources to engage in product innovation and market expansion, and encourage managers to emphasize risk-averse behavior to maintain sustainable competitive advantage [11,12]. However, other scholars suggest that the evidence for this positive relationship is somewhat ambiguous, and a history of stronger performance is no guarantee of desired results in the future [7,13]. There is a similar controversy in the organizational aspiration field. Some researchers note that organizational aspiration may lead to higher organizational performance, as it encourages employees to develop

more refined skills in exploitative activities and arouses managers' desires to explore new areas [14]. However, others have disagreements that this positive effect is not stable, and that a high-level aspiration is hard to achieve and may even result in a sustainable performance downturn [15,16]. Thus, we proposed the first research question:

RQ1: How do past performance and organizational aspiration affect organizational performance?

Given these inconsistent thoughts, we extend our attention to the role of external factor-environmental jolt, specially referring to changes of environmental munificence at the industry level. Meyer [17] introduced environmental jolts as the "transient perturbations whose occurrences are difficult to foresee and whose impacts on organizations are disruptive and potentially inimical." According to Heuer and Yan [18], firm behavior and sustainable growth are inevitably influenced by an environmental jolt since it covers the whole industry. Due to environmental jolts, the resources available for organizations alter, the demands for products and services change, and the uncertainties of consumer preferences increase [17,19,20]. Therefore, organizations need to carefully cope with unforeseen events to adapt to the new environment and maintain sustainable development. Under the conditions of an environmental jolt, the relationships between past performance, organizational aspiration and organizational performance are more complicated to discern. That is to say, an environmental jolt may reduce organizations' reliance on past performance or change their approaches to achieve their aspirations [21–23]. Thus, the second research question was proposed as follows:

RQ2: How do environmental jolts affect the relationships between past performance, organizational aspiration and organizational performance?

In order to answer these questions, we propose a model for examining these relationships and test the model by using hierarchical regression based on survey data from 183 U.S. firms. As far as we know, this paper is the pioneer empirical research to investigate the influence of past performance and organizational aspiration on organizational performance at different levels of environmental jolt. Through introducing environmental jolts as the moderator, this study yields some unexpected but interesting results, and makes several contributions to the field of organizational behavior. Additionally, to present a clear visual experience and unfold a further illustration for these results, we also plotted regression lines in the figures corresponding to the levels of environmental jolt. The valuable findings of our research provide a richer understanding of the decision-making process to managers and further expand the theory of sustainable development.

The remainder of this paper is organized as follows. We first provide the theoretical background, including a description of the focal constructs and their relationships, and present our hypotheses along with supporting arguments. Then we describe the study methodology and present the empirical results. Finally, we discuss the theoretical and practical implications of our findings, note the limitations of this study, and suggest possible avenues of future research.

2. Theoretical Background and Hypotheses

2.1. Past Performance and Organizational Performance

Past performance is a crucial element in the behavioral theory of the firm and organizational decision making [1,10,24,25]. In general, it refers to how an organization has performed in the past. Greve [26] views past performance as an indicator or signal of how well the organization can perform and how well the organization should perform. Past performance is related to intrinsic ability inside the organization and provides a criterion for organizations adapting to the external environment [27–29]. Moreover, past performance offers a synthetic evaluation of an organization's past operational and managerial activities as well as a fundamental basis for future strategy setting [11,30,31]. Past performance is therefore strongly attached to the process of sustainable growth and decision making.

Many researchers have increasingly indicated that past performance may have a close connection with organizational profitability [32,33]. When past performance is good, organizations and managers tend to reduce the incentive to change tactical approaches and become reluctant to take more

risks [7,32,34], hence leading to a stable and sustainable growth in organizational performance [13]. According to the behavioral theory of the firm, past success can lead to slack resources [1,22]. As discretionary funding, slack is conducive to enhancing sustainable competitive advantage and accelerating product innovation, which enable organizations to discover and exploit opportunities to obtain higher performance [35]. Based on Weldon et al. [36] and Jehn et al. [37], firms with past success can more easily support high professional ethics and low group conflict, which are beneficial for achieving superior performance. Thus, the following hypothesis is developed:

Hypothesis 1 (H1). *Past performance has a positive influence on organizational performance.*

2.2. Organizational Aspiration and Organizational Performance

Numerous studies have addressed the issue of organizational aspiration as a core concept in decision making and strategic management [8,38]. Organizational aspiration can be explored from three different theoretical frameworks: behavior theory, strategic management, and strategic reference point theory [9]. Behavior theory researchers assert that organizational aspiration is linked to bounded rationality, organizational learning, and search processes, on which managers need to maintain their sequential attention to ensure a satisfactory performance level [1,2]. Strategic management research has noted that organizational aspiration is affected by many factors, including internal capabilities (e.g., ability to adapt) and the external environment (e.g., market conditions), and dominated by goal-seeking aimed at maximizing rather than simply satisfying [30,39]. Strategic reference point theory treats organizational aspiration as a special reference point through which managers will perceive threats and risk intolerance when performance is above that point or perceive opportunities and risk tolerance when performance is below that point [40,41]. In this paper, we synthesize these three views and focus on the comprehensive effect of organizational aspiration on organizational performance.

The influence of organizational aspiration on a firm's survival and growth has drawn the attention of many researchers in recent years [42–44]. With the guidance of organizational aspiration, employees attend training sessions, persist in learning, and improve self-efficacy and working skills [14]. Concurrently, top managers are more active, passionate, and willing to take on challenges in the decision-making process, such as innovation [45], organizational change [31], and enterprise acquisition [46]. In addition, a clear and high-quality aspiration is more likely to trigger shared vision and team autonomy, reduce confusion and disorder, and enhance efficiency and coordination, which all contribute to better organizational performance [43,47]. Thus, the following hypothesis is developed:

Hypothesis 2 (H2). *Organizational aspiration has a positive influence on organizational performance.*

2.3. The Moderating Role of Environmental Jolts

We also acknowledge from the disagreements that a history of strong organizational performance is no guarantee of future results [7,13]. Still we notice the converse arguments that the positive effect of organizational aspiration on organizational performance is not stable [9,15]. In fact, an environmental jolt brings unexpected and transient perturbations, which are the most likely to be the cause of disturbing the aforementioned relationships. The impact of an environmental jolt on these organizational activities is a complex process. When a jolt occurs, environmental munificence drops and external uncertainty increases, which may cause harmful crises for organizations or create valuable opportunities for boosting performance [23,48,49]. In a low-level environmental jolt, the turbulence and uncertainty are relatively modest, and it is easy to obtain market information, resulting in fewer threats and opportunities [22,29]. In a high-level environmental jolt, organizations facing rapid and fierce environmental changes will experience more threats and opportunities, even in a mature and highly competitive market [5,50]. Different levels of environmental jolt thus create different environmental contexts. Therefore, we need to investigate in depth how environmental jolts impact the influence mechanism of past performance and organizational aspiration on organizational performance.

Previous discussions have revealed that a history of superior performance is beneficial for subsequent performance [51], as organizations can utilize sufficient resources to develop, refine and enhance sustainable competitive advantage [11,24]. However, when the level of environmental jolt is low, the past–subsequent pattern may present a negative profile. On the one hand, organizations despise threat signals and often do not analyze or respond to them, and even these small threats may indicate the need for strategic fine tuning [13,52]. On the other hand, managers may be satisfied with past success and thus they are less alert to earning opportunities in such a situation and therefore will benefit less [42]. As a result, organizations will implement ineffective strategies that are inherently unsuitable for the external environment, then leading to a performance downturn.

With increasing levels of environmental jolt, the dynamic environment creates more threats and opportunities in the market. In this situation, organizations will tend to cautiously deal with unexpected transitions [12,52]. More specifically, high environmental jolts are potentially associated with a new trend of products and preferences, unpredictability of customers and competitors, and high rates of industry clock-speed and innovation [10,42]. A history of high performance enables organizations to optimize slack resources [5] and encourages managers to increase risk taking [33], so as to adapt to the shifts in demand of the dynamic environment. Consequently, organizations are more likely to take advantage of these opportunities to gain better returns.

It should be emphasized that environmental jolts have a synthesized and sophisticated influence on the relationship between past performance and future performance. At low levels of sudden unexpected setback caused by an environmental jolt, past performance makes organizational performance trend downward [13]. The increase of turbulence intensity will reduce the downward trend because managers are gradually aware of the advantages of past performance in alleviating potential risk [52]. When environmental jolt increases its level from low to high, past performance would totally change its impact on organizational performance from negative to positive. High-level jolting movements make managers perceive the dominant position of utilizing past performance to seek new markets, and then promote organizational performance [34]. In sum, we hypothesize:

Hypothesis 3a (H3a). *At low levels of environmental jolt, past performance negatively affects organizational performance.*

Hypothesis 3b (H3b). *At high levels of environmental jolt, past performance positively affects organizational performance.*

Organizational aspiration may also influence organizational performance differently at different levels of environmental jolt. When environmental jolt is low, the external perturbation is relatively stable, therefore organizations have adequate time to integrate information, analyze risks, and respond to threats [16,23]. According to Greve [15], if managers raise the aspiration level at a slow pace, organizational performance will be better. At the same time, motivated by a suitable aspiration level, organizational members may increase their commitments and trust, and be willing to share personal experience [43,53]. Organizations will focus on the efficient allocation of resources, the rapid exploration of frontier technologies, and full utilization of opportunities to achieve the aspiration requirements [8,21,28] and thereby improve performance.

In the context of high environmental jolts, however, organizational aspiration is unlikely to lead to improved performance. Trying to maintain focus on aspirational pursuits may lead to disappointment and depression. Although organizations try their best to take advantage of opportunities created by the external environment, they have to prioritize the issue of dramatic changes and uncontrollable circumstances [16,22]. Indeed, unprecedented environmental pressures force organizations to deal with short-term problems of survival rather than refining strategic planning in new product development, technological innovation, and market expansion [21,49]. Finally, pursuing organizational aspiration requires a significant adjustment of resource allocation and production management and doing so in such an environment may hinder performance and make it difficult to survive, much less succeed [27].

In sum, at low levels of environmental jolt, a suitable aspiration level will facilitate enhancement of the organizational performance, while at high levels of environmental jolt, setting organizational aspiration will result in low performance. We therefore hypothesize:

Hypothesis 4a (H4a). *At low levels of environmental jolt, organizational aspiration is positively related to organizational performance.*

Hypothesis 4b (H4b). *At high levels of environmental jolt, organizational aspiration is negatively related to organizational performance.*

The proposed theoretical model of our study is presented in Figure 1.

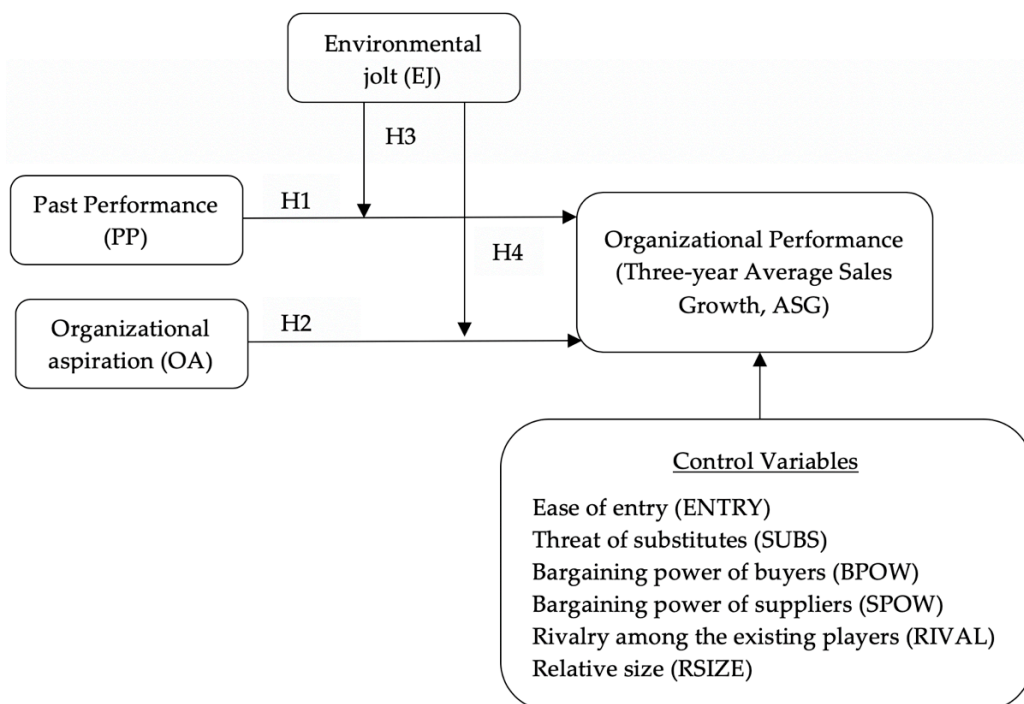


Figure 1. Theoretical framework.

3. Methodology

3.1. Study Measures

The study measures in this paper were adapted from existing well-validated, highly reliable scales used in prior research. Past performance (PP) was measured using four items adopted from Wiklund and Shepherd [28] and Song and Parry [54]. Organizational aspiration (OA) was measured using five items based on Cyert and March [1] and Shinkle [9]. Environmental jolt (EJ) was measured using four items adapted from Meyer [17] and Park and Mezias [21]. Organizational performance (OP) was measured using objective data, i.e., average sales growth (ASG) over 3 years as suggested by Song et al. [55]. We also included six control variables: ease of entry (ENTRY), threat of substitutes (SUBS), bargaining power of buyers (BPOW) and suppliers (SPOW), rivalry among the existing players (RIVAL) and relative size (RSIZE). These control variables were developed and well-validated by Narver and Slater [56] and have been used in many management and marketing studies. It is worth noting that past performance here relates to the past relative to independent variable-organizational performance rather than organizational aspiration. We considered past performance and organizational aspiration as two separate variables and measured them at the same time to avoid the risk of endogeneity.

To further validate the existing scales, we conducted a pretest to examine ease of use and possible difficulties in interpretation of the measures. We administered the pretest using an Executive Master of Business Administration (EMBA) class with 30 executives from an EMBA program located in Seattle, Washington. From the pretest, we made minor changes to the survey format. All existing measurement items remained unchanged. The results from this pretest suggest that all measurements were valid and understandable to the participants. The executives also made several comments regarding the usefulness of the survey for improving the managerial actions in their own companies. The final survey including all variables is shown in Appendix A.

3.2. Data Collection

In order to reduce the common method bias and strengthen reliability of results, we designed the research with two data collection phases with a three-year time lag. In the first phase, we collected primary data for past performance, organizational aspiration, environmental jolt and control variables. In the second phase, we collected objective data for organizational performance. Then the data used for testing the proposed theoretical model were merged from these two different data sets. The content of each data set is detailed as follows:

First Data Set. The sample population was all manufacturing firms in three industries listed in Ward's Business Directory of U.S. Private and Public Companies. The three industries comprised companies in home appliances, consumer electronics and computer and software. We selected these three industries because they had experienced environmental jolt at different levels. We randomly chose a sample of 1500 firms for the first data collection. Before starting the survey, we contacted the firms to seek their prior approval of participation. A total of 487 companies agreed to participate and provide a contact person. The response rate for the pre-survey was 32%. We followed the standard survey method procedure outlined in Dilliman [57] and sent the survey with cover letter, business card, and a promise to provide a research report to all 487 managers. After three follow-up priority mails, we collected 276 usable responses.

Second Data Set. Three years later, we collected data on the dependent variable (i.e., sales for three years) in a separate research project using the same sample. This second data set was compiled in a similar manner. For this study, we merged the second data set with the first data set and obtained 183 firms that had data for the model in Figure 1. Therefore, the data used for the testing of the theoretical model in Figure 1 includes these 183 companies. The final data includes 70 companies in the computer and software industry, 42 home appliances companies, and 71 consumer electronics companies. The demographic characteristics of the 183 informants are: 135 managers are male and 48 managers are female; working experience ranges from 12 to 26 years; all respondents have at least a college-level degree; 124 respondents have a graduate-level degree; 151 respondents are senior and executive level managers (VP for marketing, operations, or R&D) and the remaining 32 are unit/division general managers.

3.3. Data Analysis

The unit of analysis was the firm. To test our theoretical model, we conducted hierarchical regression analyses following the classical standard procedures introduced by Aiken et al. [58] and Cohen et al. [59]. The software we applied to analyze the research data was SPSS 24.0. We employed factor analyses for all multi-item variables. All scales were calculated using the average score of all the relevant items. We entered the independent variables into the regression equation in three successive steps. In the first step, six control variables were entered to assess possible effects on performance. In the second step, two independent variables (past performance and organizational aspiration) and one moderator variable (environmental jolt) were entered. In the final step, the two interaction terms were entered to test our hypotheses.

4. Results

Table 1 presents the means, standard deviations, and correlations for the study measures. All multi-item constructs have good reliability, with Cronbach's alphas ranging from 0.84 to 0.87. The results of the hypothesis test are shown in Table 2.

Table 1. Descriptive statistics.

	1	2	3	4	5	6	7	8	9	10
1. OP	N/A									
2. PP	0.42 ***	0.87								
3. OA	0.42 ***	0.50 ***	0.84							
4. EJ	0.31 ***	0.58 ***	0.46 ***	0.86						
5. ENTRY	−0.04	−0.04	−0.03	−0.03	N/A					
6. SUBS	0.02	−0.06	−0.10	−0.02	0.55 ***	N/A				
7. BPOW	0.09	0.01	−0.04	0.02	−0.17 **	−0.15 **	N/A			
8 SPOW	0.01	−0.12	−0.12	−0.18 **	0.42 ***	0.54 ***	−0.11	N/A		
9. RIVAL	−0.02	−0.04	−0.09	−0.19 **	0.40 ***	0.39 ***	0.02	0.46 ***	N/A	
10. RSIZE	0.01	0.06	0.10	0.08	−0.21 ***	−0.21 ***	−0.02	−0.19 **	−0.21 ***	N/A
Mean	55.07	4.38	4.73	4.37	3.46	3.13	3.87	3.43	3.63	4.34
S.D.	30.28	1.49	1.22	1.46	1.59	1.64	2.23	1.61	1.71	1.54

Note: S.D. = standard deviation, PP = past performance, OA = organizational aspiration, EJ = environmental jolt, OP = organizational performance, ENTRY = ease of entry, SUBS = threat of substitutes, BPOW = bargaining power of buyers, SPOW = bargaining power of suppliers, RIVAL = rivalry among the existing players, RSIZE = relative size. Entry on the diagonal is the Cronbach's alpha. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, two-tailed test.

Table 2. Hypotheses results from regression analyses.

	Dependent Variable: Three-Year Average Sales Growth (ASG)		
	Model 1 Coefficient (SE)	Model 2 Coefficient (SE)	Model 3 Coefficient (SE)
Intercept	50.39 (11.88) ***	−11.77 (13.56)	−48.59 (25.84) *
Past performance (PP)		5.24 (1.74) ***	−3.78 (5.19)
Organizational aspiration (OA)		7.11 (1.97) ***	23.18 (6.50) ***
Environmental jolt (EJ)		0.90 (1.78)	11.02 (5.88) *
Past performance * Environmental jolt (PP *EJ)			2.13 (1.15) **
Organizational aspiration * Environmental jolt (OA *EJ)			−3.92 (1.51) ***
Ease of entry (ENTRY)	−1.08 (1.79)	−1.52 (1.57)	−2.11 (1.57)
Threat of substitutes (SUBS)	1.12 (1.82)	1.39 (1.62)	1.85 (1.61)
Bargaining power of buyers (BPOW)	1.22 (1.05)	1.40 (0.92)	1.37 (0.91)
Bargaining power of suppliers (SPOW)	0.55 (1.78)	1.77 (1.58)	1.33 (1.58)
Rivalry among the existing players (RIVAL)	−0.66 (1.56)	−0.52 (1.41)	−0.03 (1.40)
Relative size (RSIZE)	0.16 (1.53)	−0.53 (1.35)	−1.16 (1.35)
F value	0.36	6.55 ***	6.13 ***
R ²	0.01	0.25	0.28
ΔF		18.69 ***	3.43 **

Note: $n = 183$. SE = standard error. One-tailed for hypothesized effects, two-tailed for other effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The results presented in Table 2 for Model 2 indicate that past performance is significantly and positively related to organizational performance ($\beta = 5.24$, $p < 0.01$). The relationship between organizational aspiration and organizational performance is also significantly positive ($\beta = 7.11$, $p < 0.01$). The R^2 for Model 2 is 0.25. Thus, hypothesis 1 and hypothesis 2 are supported.

To test the moderating effect of environmental jolts, we performed hierarchical regression analysis to examine the significance of the interaction effects [60]. The model was first run without the moderating effect of environmental jolts (Model 2) and later with interaction terms added (Model 3). Comparing the reduced model (without moderating effect) with the full model, we have an F value change that is statistically significant at the 0.05 level ($\Delta F = 3.43$, $p < 0.05$). The results support our basic premise, which is that environmental jolts have moderating effects. The results indicated the hypothesized model presented in Figure 1 has higher R^2 ($F = 6.13$, $p < 0.01$). The R^2 for Model 3 is 0.28, suggesting that Model 3 explains 28% of the variances in the performance data.

The Model 3 results in Table 2 show that the coefficient of the interaction term between environmental jolt and past performance is positive and significant ($\beta = 2.13, p < 0.05$), indicating environmental jolt positively moderates the relationship between past performance and organizational performance. The interaction term between environmental jolt and organizational aspiration is significantly and negatively related to organizational performance ($\beta = -3.92, p < 0.01$), meaning that environmental jolt negatively moderates the relationship between organizational aspiration and organizational performance. To verify the strength of interaction effect, we also run sales growth of each individual year. The results are shown in Table 3. In Models 4 and 5, the interaction terms are all significant and the main findings of this study are not changed, which suggests that the results are robust.

Table 3. Additional comparison test.

	Sale Growth 1	Sale Growth 2
	Model 4	Model 5
	Coefficient (SE)	Coefficient (SE)
Intercept	−65.89 (24.75) ***	−31.30 (28.80)
Past performance (PP)	−3.95 (4.98)	−3.62 (5.79)
Organizational aspiration (OA)	23.55 (6.22) ***	22.81 (7.24) ***
Environmental jolt (EJ)	10.95 (5.63) *	11.09 (6.56) *
Past performance * Environmental jolt (PP *EJ)	2.19 (1.10) **	2.08 (1.28) *
Organizational aspiration * Environmental jolt (OA *EJ)	−3.95 (1.44) ***	−3.90 (1.68) **
Ease of entry (ENTRY)	−1.55 (1.50)	−2.67 (1.75)
Threat of substitutes (SUBS)	1.57 (1.54)	2.12 (1.79)
Bargaining power of buyers (BPOW)	1.56 (0.87) *	1.19 (1.01)
Bargaining power of suppliers (SPOW)	1.20 (1.50)	1.46 (1.76)
Rivalry among the existing players (RIVAL)	−0.50 (1.34)	0.44 (1.57)
Relative size (RSIZE)	−1.37 (1.29)	−0.94 (1.50)
F value	7.07 ***	4.71 ***
R ²	0.31	0.23
ΔF	3.80 **	2.72 *

Note: n = 183. SE = standard error. One-tailed for hypothesized effects, two-tailed for other effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

As we mentioned in Section 2, different levels of environmental jolt can create different environmental contexts. Managers in firms always take different actions in response to the different intensities of turbulence. When environmental jolt increases its level from low to high, past performance and organizational aspiration may radically change their impacts on organizational performance from positive to negative, or from negative to positive, or even have no effects. Thus, the interpretations of the main effects and the moderating effects together are more complicated and require closer examination according to the fluctuation degree. To test H3a–H4b and present a clear visual experience of these relationships, we followed Hayes and Matthes [61] by employing the pick-a-point approach to perform further analyses of environmental jolt's moderating effects; see Figures 2 and 3.

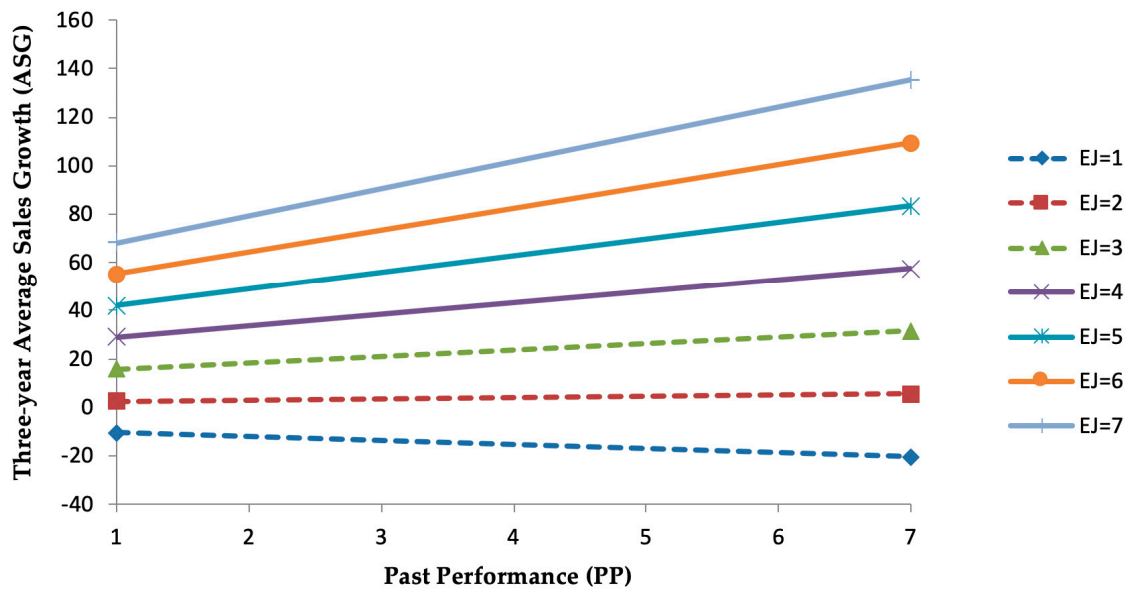


Figure 2. Effects of past performance on three-year average sales growth at different levels of EJ.

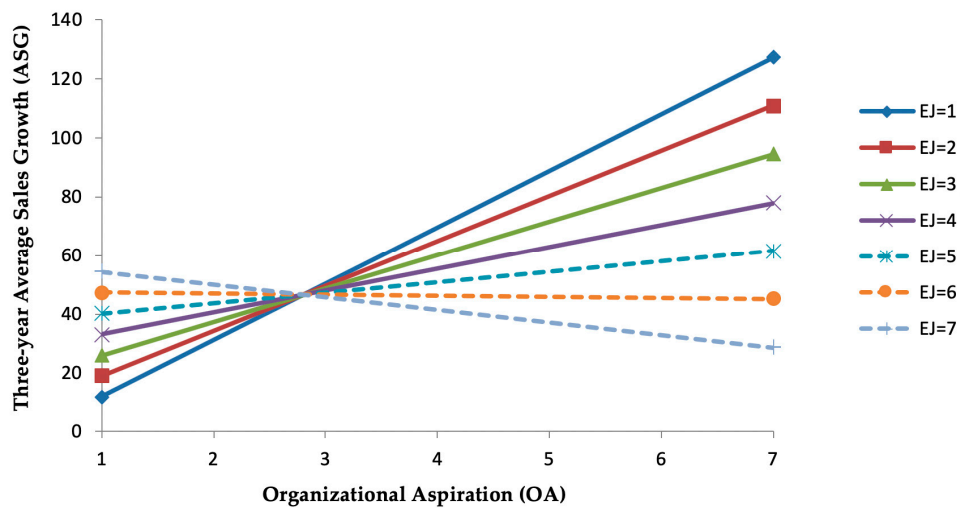


Figure 3. Effects of organizational aspiration on three-year average sales growth at different EJ.

Figure 2 presents the moderating effects of the environmental jolt on the relationship between past performance and organizational performance. The solid line slope is significant at $p < 0.05$; the dashed line indicates the slope is not significant. All significance tests use a one-tailed test. No significant effect was found between past performance and organizational performance when the environmental jolt is below 4. Therefore, hypothesis H3a is not supported. But the results indicate that the relationship between past performance and organizational performance is significantly and positively affected by environmental jolt equal to 4 or higher ($p < 0.05$). Thus, hypothesis H3b is supported. In other words, we find that increased past performance leads to increased organizational performance under the condition of environmental jolt levels varying from 4 to 7.

Inconsistent with hypothesis H3a, low levels of environmental jolt do not force past performance to have a negative impact on its future performance. The threats arising from an unexpected setback and jolting movement are completely counteracted by the superiority of past performance. Under such conditions, past performance has no effects on organizational performance. H3b states that past performance is positively related to organizational performance when environmental jolt is high. As shown in Figure 2, this positive relationship would be stronger as the level of environmental jolt increases.

Figure 3 presents the moderating effects of environmental jolt on the relationship between organizational aspiration and organizational performance. The solid line slope is significant at $p < 0.05$; the dashed line indicates the slope is not significant. All significance tests use the one-tailed test. When the level of environmental jolt is 4 or lower, environmental jolt significantly and negatively moderates the positive relationship between organizational aspiration and organizational performance ($p < 0.05$). Therefore, hypothesis H4a is supported. The relationship between organizational aspiration and organizational performance becomes negative but nonsignificant when environmental jolt is equal to or above 5. It means that environmental jolt has no significant moderating effect at levels of 5 through 7. Therefore, hypothesis H4b is not supported.

5. Discussion

In this study we explored the influence of past performance and organizational aspiration on organizational performance at different levels of environmental jolt. Definitely, both past performance and organizational aspiration bring positive contributions to organizational performance. Moreover, it is worth noting that our research underlines the importance of considering environmental jolts when exploring these positive relationships. We found that the interaction effects of environmental jolts with past performance and organizational aspiration on organizational performance are different. Environmental jolts positively influence the relationship between past performance and organizational performance, but negatively affect the relationship between organizational aspiration and organizational performance.

Most importantly, in the context of environmental jolt, we find two major interesting results. First, past performance increases organizational performance when environmental jolt is high. While beyond our hypothesis, the empirical findings reveal that at low levels of environmental jolt, past performance has no effect on organizational performance. One explanation could be that the detrimental trend derived from environmental jolts is counteracted by the performance advantages accumulated in the past. Managers are confident enough from past success to resist threats and reluctant to take risks to expand new markets [52]. Firms utilize their existing superiorities to buffer the environmental jolts, and meanwhile avoid the potential venture. Thus, the influence of past performance is not negative but only has no significance in such a context. Evidence from our sample indicates that past performance is powerful enough to offset external fluctuations, however, the results may be different in other industries or countries, and extended research is still needed.

Second, organizational aspiration increases organizational performance at low levels of environmental jolt. Different from our expectation, it has no effect on organizational performance when environmental jolt is high. Indeed, the negative connection probably occurs at a very high level of environmental jolt (see Figure 3, EJ = 7), but it is not significant in this study. Generally, firms would set up an emergency response system to reply to a fierce accident or fluctuation during the process of production and operation. This protection mechanism will transfer the firm's attention to deal with the sudden changes and even crises. Therefore, the impact of organizational aspiration is diminished. This may be the reason to interpret organizational aspiration as having no effect on organizational performance during a high environmental jolt. The findings of our empirical analysis have some significant theoretical and practical implications, several of which suggest avenues for future research.

5.1. Theoretical Implications

Previous studies have the awareness that past performance and organizational aspiration may affect organizational performance positively [24,38] or negatively [15,32], but the role of environmental factors in this interaction had thus far been overlooked. We filled the gap by testing these interactions at different levels of environmental jolt, represented by lines of different trend depending on volatility level (see Figures 2 and 3). We address not only the question of whether past performance and aspiration benefit organizations but also in what environmental contexts they can lead to higher performance. Our findings underline the importance of considering the environmental context and

provide a richer approach to understanding the impact of past performance and organizational aspiration on organizational performance.

It is interesting that we obtained mixed results in our study. On one hand, we found that, at low levels of environmental jolt, past performance does not significantly influence organizational performance. On the other hand, our findings indicate that, at high levels of environmental jolt, a history of superior performance tends to bring higher organization performance, as managers become more active and boldly work to seize market opportunities. Because a higher level of environmental jolt leads to more uncertainty about future market conditions, organizations have to rely more on past information to make decisions [22]. Therefore, we find support for the notion that high levels of environmental jolt positively moderate the relationship between past performance and organizational performance (see Figure 2).

In contrast, we find that organizational aspiration contributes to better performance under low levels of environmental jolt. However, the moderating effect of a low environmental jolt is negative, thus the slope of linear distribution gradually decreases (see Figure 3). A convincing explanation is that organizational learning plays an important role in achieving organizational aspiration and gaining better organizational performance. Low levels of environmental jolt offer organizations the possibility of learning new knowledge and novel technology from outside [1]. Still through organizational learning, organization members could assimilate existing experiences and skills [26]. With an increase of turbulence intensity, an organization's emphasis on organizational learning recedes, and the positive influence of organizational aspiration on organizational performance also weakens. When environmental jolt increases to a high level, the impact of organizational aspiration on organizational performance is no longer significant. This is consistent with actual practice, as dramatic and unforeseen environmental changes compel organizations to focus on dealing with short-term problems of survival rather than on pursuing long-term goals for growth and development [16].

Though some scholars asserted that external factors should be considered as moderators when investigating the relationships between past performance, organizational aspiration, and organizational performance, they did not emphasize the importance of environmental jolts. To our knowledge, this paper is the first study to examine the interaction effects of environmental jolts with past performance and organizational aspiration on organizational performance. More importantly, our research adds to the empirical findings of previous literature. This study underlines that the interaction effect of environmental jolts is different according to its jolt levels. It is the low levels of environmental jolt that have a negative moderating effect on the relationship between organizational aspiration and organizational performance, while high levels of environmental jolt have a positive moderating effect on the relationship between past performance and organizational performance. This paper therefore enriches the behavioral theory of the firm and the theory of sustainable development.

5.2. Practical Implications

The implications of our findings for practitioners and decision makers are twofold. Although we argue that past performance and organizational aspiration can promote organizational performance, in the context of environmental jolts, practitioners and decision makers should be aware that the process of achieving superior performance is complex and inconsistent. Organizations with a stronger history of success may utilize radical environmental jolts to develop new products and markets, thus creating competitive advantages. Managers of these organizations can take advantage of external opportunities created by such an environment to gain better returns rather than respond in a risk-averse manner. However, at low levels of environmental jolt, the benefit of past success is obscured, thus organizations should rely more on aspirational pursuits. Setting a suitable level of aspiration is the proper strategy for an organization to address such environmental jolts, which can motivate organization members to combine their efforts, try their best, maintain enthusiasm, and eventually achieve higher performance. Therefore, organizations experiencing low-level environmental jolts would be better to utilize a suitable

aspiration to improve organizational performance, while those organizations encountering high-level environmental jolts need to pay more attention to the advantages of past performance.

5.3. Limitations and Future Research Directions

This study has several limitations that should be considered and that also suggest directions for future research. First, the data set includes companies only from the United States, which constrains any generalizability of the results to other countries. Moreover, the sample includes firms in only three industries: computer and software, home appliances, and consumer electronics. Thus, our analysis may omit certain aspects of antecedents and outcomes that are probably common in other industries (e.g., service industries). Therefore, testing our model in other countries and industries would extend the applicability of these findings.

Second, we considered the environmental jolt as a single construct and did not consider the cause of the jolt, which may derive from market turbulence, technological innovation, or policy change. The mechanisms of these disturbances are likely to be inconsistent. Potentially, environmental change is detrimental to firms because operational management could be interrupted and production planning may not be implemented. However, this situation is not absolute as firms may also seize the opportunity to earn positive outcomes under a given type of uncertainty. Thus, in future studies, scholars should collect data on these specific environmental jolt types to explore whether they have different influences on the past performance, organizational aspiration, and organizational performance relationships.

Finally, other relevant factors should be taken into account as the moderating or mediating variables, which may explain better the role of past performance and organizational aspiration on organizational performance. In this study we focused on past performance and organizational aspiration and limited our attention to their interaction with environmental jolts. However, some scholars have pointed out that dynamic aspiration adjustment and team autonomy may also intercede in the process of decision making to enhance organizational performance [43]. Additionally, organizational slack, organizational learning and strategic planning are also seminal elements in the field of organizational behavior that may act as the missing link construct between past performance, organizational aspiration and organizational performance. Future studies should also introduce these factors and evaluate their impacts.

6. Conclusions

Past performance and organizational aspiration have played an important role in the process of firm survival and sustainable growth. However, debates still exist about their influence on improving organizational performance. In this study, we extended these arguments by considering the effect of environmental context. We focused on past performance and organizational aspiration and demonstrated that their relationships with organizational performance are moderated by environmental jolts. The results indicate that both past performance and organizational aspiration have a positive impact on organizational performance. Moreover, environmental jolts weaken the positive relationship between organizational aspiration and organizational performance, while magnifying the positive influence of past performance on organizational performance. Specifically, we find two interesting results. First, past performance increases organizational performance when environmental jolt is high. Counter to our expectations, the empirical findings reveal that at low levels of environmental jolt, past performance has no effect on organizational performance. Second, while organizational aspiration increases organizational performance at low levels of environmental jolt, it has no effect on organizational performance when environmental jolt is high. We hope our findings provide some basis for future studies to address the interaction of past performance, organizational aspiration, and environmental jolts in the evaluation of organizational performance.

Author Contributions: All authors contribute equally to the development of this research. Conceptualization, C.H. and M.S.; Data curation, M.S.; Methodology, C.H. and H.Z.; writing—Original draft, C.H.; writing—Review & editing, H.Z. and D.L.

Funding: This research was funded by China Scholarship Council, grant number 201706120235; Natural Science Foundation of Shaanxi Province of China, grant number 2018JQ7003; and Shaanxi Province of China, Department of Education Scientific Research Plan Projects, grant number 18JK0367.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Organizational Performance: Three-year average sales growth (ASG) = (Sale growth 1 + Sale growth 2)/2

Sale growth 1 = (Second year total revenues – first year total revenues)/first year total revenues × 100%

Sale growth 2 = (Third year total revenues – second year total revenues)/second year total revenues × 100%

Past Performance (PP): Based on Wiklund and Shepherd [28] and Song and Parry [54]. Cronbach's alpha = 0.87. 1 = Far less than the objectives, 7 = Far exceeded the objectives.

PP1. Relative to your company's objectives, how successful was your company last year in terms of revenues?

PP2. Relative to your company's objectives, how successful was your company last year in terms of market share?

PP3. Relative to your company's objectives, how successful was your company last year in terms of net income?

PP4. Relative to your company's objectives, how successful was your company last year in terms of revenue growth rate?

Organizational Aspiration (OA): Based on Cyert and March [1] and Shinkle [9]. Cronbach's alpha = 0.84. 1 = Far less than the industry average, 7 = Far exceeded the industry average.

OA1. Relative to industry standard, our aspiration for total revenue last year was;

OA2. Relative to industry standard, our aspiration for net income last year was;

OA3. Relative to industry standard, our aspiration for market share last year was;

OA4. Relative to industry standard, our aspiration for revenue growth last year was;

OA5. Relative to industry standard, our aspiration for developing innovative products and services last year was.

Environmental jolt (EJ): Based on Meyer [17] and Park and Mezas [21]. Cronbach's alpha = 0.86. 1 = strongly disagree, 7 = strongly agree.

EJ1: The growth in this industry is going through a sudden, unexpected setback.

EJ2: The demand for product and services in this industry is going through a sudden, unexpected setback.

EJ3: The profitability in this industry is going through a jolting movement.

EJ4: The growth in this industry is going through a jolting movement.

Control Variables: Adopted from Narver and Slater [56].

Ease of entry (ENTRY). How easy is it for new entrants to start competing in this industry? 1 = very easy, 7 = very difficult.

Threat of substitutes (SUBS). How easy can a product or service be substituted in this industry? 1 = very easy, 7 = very difficult.

Bargaining power of buyers (BPOW). The extent to which our customers are able to negotiate lower prices in this industry. 1 = very low, 7 = very high.

Bargaining power of suppliers (SPOW). The extent to which we are able to negotiate lower prices from our suppliers in this industry. 1 = very low, 7 = very high.

Rivalry among the existing players (RIVAL). The extent to which there is a strong competition between the existing players in this industry. (1 = very low; 7 = very high).

Relative size (RSIZE). The size of our annual sales revenues in the principal served market segment in relation to those of our largest competitor is: 1 = much smaller than the largest competitor, 7 = much larger than the largest competitor.

References

1. Cyert, R.M.; March, J.G. *A Behavioral Theory of the Firm*, 2nd ed.; Blackwell Publisher: Oxford, UK, 1992.
2. Bromiley, P.; Harris, J.D. A comparison of alternative measures of organizational aspirations. *Strateg. Manag. J.* **2014**, *35*, 338–357. [[CrossRef](#)]
3. Wennberg, K.; Delmar, F.; McKelvie, A. Variable risk preferences in new firm growth and survival. *J. Bus. Ventur.* **2016**, *31*, 408–427. [[CrossRef](#)]
4. Manuti, A.; Giancaspro, M.L. People make the difference: An explorative study on the relationship between organizational practices, employees' resources, and organizational behavior enhancing the psychology of sustainability and sustainable development. *Sustainability* **2019**, *11*, 1499. [[CrossRef](#)]
5. Bradley, S.W.; Aldrich, H.; Shepherd, D.A.; Wiklund, J. Resources, environmental change, and survival: Asymmetric paths of young independent and subsidiary organizations. *J. Manag. Stud.* **2011**, *32*, 486–509. [[CrossRef](#)]
6. Chen, W.-R. Determinants of firms' backward-and forward-looking R&D search behavior. *Organ. Sci.* **2008**, *19*, 609–622.
7. Maclean, M.; Harvey, C.; Sillince, J.A.A.; Golant, B.D. Living up to the past? Ideological sensemaking in organizational transition. *Organization* **2014**, *21*, 543–567. [[CrossRef](#)]
8. Blettner, D.P.; He, Z.-L.; Hu, S.; Bettis, R.A. Adaptive aspirations and performance heterogeneity: Attention allocation among multiple reference points. *Strateg. Manag. J.* **2015**, *36*, 987–1005. [[CrossRef](#)]
9. Shinkle, G.A. Organizational aspirations, reference points, and goals: Building on the past and aiming for the future. *J. Manag.* **2012**, *38*, 415–455. [[CrossRef](#)]
10. Nadkarni, S.; Narayanan, V.K. Strategic schemas, strategic flexibility, and firm performance: The moderating role of industry clockspeed. *Strateg. Manag. J.* **2007**, *28*, 243–270. [[CrossRef](#)]
11. Hendricks, K.B.; Singhal, V.R. An empirical analysis of the effect of supply chain disruptions on long-run stock price performance and equity risk of the firm. *Prod. Oper. Manag.* **2005**, *14*, 35–52. [[CrossRef](#)]
12. Li, D.-Y.; Liu, J. Dynamic capabilities, environmental dynamism, and competitive advantage: Evidence from China. *J. Bus. Res.* **2014**, *67*, 2793–2799. [[CrossRef](#)]
13. Audia, P.G.; Locke, E.A.; Smith, K.G. The paradox of success: An archival and a laboratory study of strategic persistence following radical environmental change. *Acad. Manag. J.* **2000**, *43*, 837–853.
14. Kauppila, O.-P.; Tempelaar, M.P. The social-cognitive underpinnings of employees' ambidextrous behaviour and the supportive role of group Managers' leadership. *J. Manag. Stud.* **2016**, *53*, 1019–1044. [[CrossRef](#)]
15. Greve, H.R. Sticky aspirations: Organizational time perspective and competitiveness. *Organ. Sci.* **2002**, *13*, 1–17. [[CrossRef](#)]
16. Baum, J.A.C.; Rowley, T.J.; Shipilov, A.V.; Chuang, Y.-T. Dancing with strangers: Aspiration performance and the search for underwriting syndicate partners. *Adm. Sci. Q.* **2005**, *50*, 536–575. [[CrossRef](#)]
17. Meyer, A.D. Adapting to environmental jolts. *Adm. Sci. Q.* **1982**, *27*, 515–537. [[CrossRef](#)] [[PubMed](#)]
18. Heuer, M.; Yan, S. Exploring the strategic inclinations of Japanese environmental NPOs in Post-Fukushima Japan. *Sustainability* **2018**, *10*, 751. [[CrossRef](#)]
19. Meyer, A.D.; Brooks, G.R.; Goes, J.B. Environmental jolts and industry revolutions: Organizational responses to discontinuous change. *Strateg. Manag. J.* **1990**, *11*, 93–110.
20. Meyer, A.D.; Gaba, V.; Colwell, K.A. Organizing far from equilibrium: Nonlinear change in organizational fields. *Organ. Sci.* **2005**, *16*, 456–473. [[CrossRef](#)]
21. Park, N.K.; Mezas, J.M. Before and after the technology sector crash: The effect of environmental munificence on stock market response to alliances of e-commerce firms. *Strateg. Manag. J.* **2005**, *26*, 987–1007. [[CrossRef](#)]
22. Chen, Y.; Song, M. R&D Search under environmental jolts: Evidence from new ventures in the United States. In Proceedings of the 2013 Academy of Management Meeting, Lake Buena Vista, FL, USA, 9–13 August 2013; p. 12466.
23. Alexiev, A.S.; Volberda, H.W.; Van den Bosch, F.A.J. Interorganizational collaboration and firm innovativeness: Unpacking the role of the organizational environment. *J. Bus. Res.* **2016**, *69*, 974–984. [[CrossRef](#)]

24. Tan, J.; Peng, M.W. Organizational slack and firm performance during economic transitions: Two studies from an emerging economy. *Strateg. Manag. J.* **2003**, *24*, 1249–1263. [[CrossRef](#)]
25. Lages, L.F.; Jap, S.D.; Griffith, D.A. The Role of past performance in export ventures: A short-term reactive approach. *J. Int. Bus. Stud.* **2008**, *39*, 304–325. [[CrossRef](#)]
26. Greve, H.R. *Organizational Learning from Performance Feedback: A Behavioral Perspective on Innovation and Change*; Cambridge University Press: Cambridge, UK, 2003.
27. Kraatz, M.S.; Zajac, E.J. How organizational resources affect strategic change and performance in turbulent environments: Theory and evidence. *Organ. Sci.* **2001**, *12*, 632–657. [[CrossRef](#)]
28. Wiklund, J.; Shepherd, D. Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses. *Strateg. Manag. J.* **2003**, *24*, 1307–1314. [[CrossRef](#)]
29. Wu, L.-Y. Applicability of the resource-based and dynamic-capability views under environmental volatility. *J. Bus. Res.* **2010**, *63*, 27–31. [[CrossRef](#)]
30. Ansoff, H. *Strategic Management*; Macmillan: London, UK, 1979.
31. Labianca, G.; Fairbank, J.F.; Andrevski, G.; Parzen, M. Striving toward the future: Aspiration–performance discrepancies and planned organizational change. *Strateg. Organ.* **2009**, *7*, 433–466. [[CrossRef](#)]
32. Amason, A.C.; Mooney, A.C. The effects of past performance on top management team conflict in strategic decision making. *Int. J. Confl. Manag.* **1999**, *10*, 340–359. [[CrossRef](#)]
33. Hu, S.; Blettner, D.; Bettis, R.A. Adaptive aspirations: Performance consequences of risk preferences at extremes and alternative reference groups. *Strateg. Manag. J.* **2011**, *32*, 1426–1436. [[CrossRef](#)]
34. Bromiley, P. Testing a causal model of corporate risk taking and performance. *Acad. Manag. J.* **1991**, *34*, 37–59.
35. Wang, H.; Choi, J.; Wan, G.; Dong, J.Q. Slack resources and the rent-generating potential of firm-specific knowledge. *J. Manag.* **2016**, *42*, 500–523. [[CrossRef](#)]
36. Weldon, E.; Jehn, K.A.; Pradhan, P. Processes that mediate the relationship between a group goal and improved group performance. *J. Pers. Soc. Psychol.* **1991**, *61*, 555–569. [[CrossRef](#)] [[PubMed](#)]
37. Jehn, K.A.; Northcraft, G.B.; Neale, M.A. Why differences make a difference: A field study of diversity, conflict, and performance in workgroups. *Adm. Sci. Q.* **1999**, *44*, 741–763. [[CrossRef](#)]
38. Diecidue, E.; Van de Ven, J. Aspiration level, probability of success and failure, and expected utility. *Int. Econ. Rev.* **2008**, *49*, 683–700. [[CrossRef](#)]
39. Ansoff, H.I. The emerging paradigm of strategic behavior. *Strateg. Manag. J.* **1987**, *8*, 501–515. [[CrossRef](#)]
40. Kahneman, D.; Tversky, A. Prospect theory: An analysis of decision under risk. *Econometrica* **1979**, *47*, 263–291. [[CrossRef](#)]
41. Fiegenbaum, A.; Hart, S.; Schendel, D. Strategic reference point theory. *Strateg. Manag. J.* **1996**, *17*, 219–235. [[CrossRef](#)]
42. Wiklund, J.; Shepherd, D. Aspiring for, and achieving growth: The moderating role of resources and opportunities. *J. Manag. Stud.* **2003**, *40*, 1919–1941. [[CrossRef](#)]
43. Gonzalezmulé, E.; Courtright, S.H.; Degeest, D.S.; Seong, J.-Y.; Hong, D.-S. Channeled autonomy: The joint effects of autonomy and feedback on team performance through organizational goal clarity. *J. Manag.* **2014**, *42*, 2018–2033.
44. Grainger-Brown, J.; Malekpour, S. Implementing the sustainable development goals: A review of strategic tools and frameworks available to organisations. *Sustainability* **2019**, *11*, 1381. [[CrossRef](#)]
45. Greve, H.R. A behavioral theory of R&D expenditures and innovations: Evidence from shipbuilding. *Acad. Manag. J.* **2003**, *46*, 685–702.
46. Kim, J.-Y.J.; Finkelstein, S.; Haleblan, J.J. All aspirations are not created equal: The differential effects of historical and social aspirations on acquisition behavior. *Acad. Manag. J.* **2015**, *58*, 1361–1388. [[CrossRef](#)]
47. Carton, A.M.; Murphy, C.; Clark, J.R. A (blurry) vision of the future: How leader rhetoric about ultimate goals influences performance. *Acad. Manag. J.* **2014**, *57*, 1544–1570. [[CrossRef](#)]
48. Dess, G.G.; Beard, D.W. Dimensions of organizational task environments. *Adm. Sci. Q.* **1984**, *29*, 52–73. [[CrossRef](#)]
49. Wan, W.P.; Yiu, D.W. From crisis to opportunity: Environmental jolt, corporate acquisitions, and firm performance. *Strateg. Manag. J.* **2009**, *30*, 791–801. [[CrossRef](#)]
50. Jaworski, B.J.; Kohli, A.K. Market orientation: Antecedents and consequences. *J. Mark.* **1993**, *57*, 53–70. [[CrossRef](#)]

51. Hu, Y.; Zhao, X.; Chen, Y. The Influence of managerial mindfulness on innovation: Evidence from China. *Sustainability* **2019**, *11*, 2914. [[CrossRef](#)]
52. Wan, W.P.; Hoskisson, R.E. Home country environments, corporate diversification strategies, and firm performance. *Acad. Manag. J.* **2003**, *46*, 27–45.
53. Lee, J.S.; Keil, M.; Wong, K.F.E. The effect of goal difficulty on escalation of commitment. *J. Behav. Decis. Mak.* **2015**, *28*, 114–129. [[CrossRef](#)]
54. Song, X.M.; Parry, M.E. A cross-national comparative study of new product development processes: Japan and the United States. *J. Mark.* **1997**, *61*, 1–18. [[CrossRef](#)]
55. Song, L.Z.; Song, M.; Di Benedetto, C.A. Resources, supplier investment, product launch advantages, and first product performance. *J. Oper. Manag.* **2011**, *29*, 86–104. [[CrossRef](#)]
56. Narver, J.C.; Slater, S.F. The effect of a market orientation on business profitability. *J. Mark.* **1990**, *54*, 20–35. [[CrossRef](#)]
57. Dilliman, D.A. *Mail and Telephone Surveys: The Total Design Method*; Wiley-Interscience: New York, NY, USA, 1978.
58. Aiken, L.S.; West, S.G.; Reno, R.R. *Multiple Regression: Testing and Interpreting Interactions*; Sage: London, UK, 1991.
59. Cohen, J.; Cohen, P.; West, S.G.; Aiken, L.S. *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*, 3rd ed.; Erlbaum: Mahwah, NJ, USA, 2003.
60. Jaccard, J.; Wan, C.K.; Turrisi, R. The detection and interpretation of interaction effects between continuous variables in multiple regression. *Multivar. Behav. Res.* **1990**, *25*, 467–478. [[CrossRef](#)] [[PubMed](#)]
61. Hayes, A.F.; Matthes, J. Computational procedures for probing interactions in OLS and logistic regression: SPSS and SAS implementations. *Behav. Res. Methods* **2009**, *41*, 924–936. [[CrossRef](#)] [[PubMed](#)]



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